With the Author's Compliments

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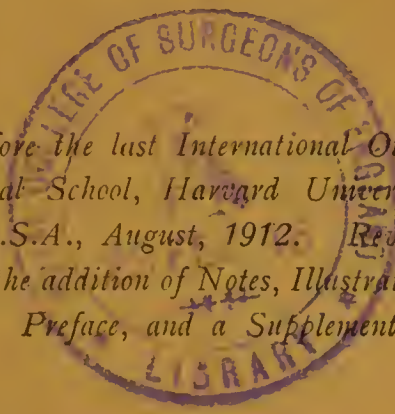
THE PREVENTION

OF THE

DEAFNESS AND MORTALITY

WHICH RESULT FROM

AURAL SUPPURATION



A Paper read before the last International Otological Congress at the Medical School, Harvard University, Boston, Mass., U.S.A., August, 1912. Revised and with the addition of Notes, Illustrations, a Preface, and a Supplement

BY

CHARLES J. HEATH, F.R.C.S. Eng.

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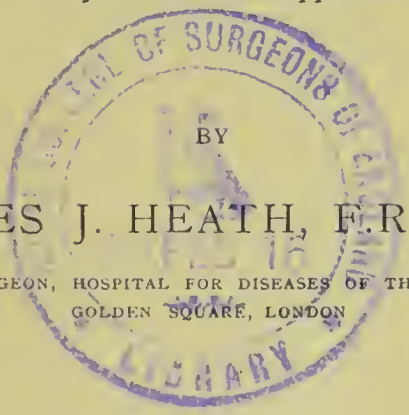
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PREFACE.

In drawing attention once again to the inadequacy of the prevailing treatment of aural suppuration, a treatment which is essentially one of inaction, I continue the crusade I started in 1906.

Every year since then thousands have been killed by this disease and hundreds of thousands rendered permanently deaf by it. Moreover, directly or indirectly, aural suppuration has come to be an appreciable tax upon the community, responsible as it is for a large proportion of deaf mutes both in and outside asylums.

The need of some effective treatment is therefore an urgent one.

The fatal and nearly fatal cases of meningitis, brain abscess, and septic thrombosis resulting from aural suppuration, are practically all due to inadequate treatment of the aural trouble during the stage in which it is curable without loss of hearing. How frequent these calamities are is shown by the extent of the literature which is devoted to them, and by the amount of attention they receive at otological meetings.

The large number of men who are disqualified for active military service in the war now raging, in consequence of deafness due to present or past aural suppuration, should help to drive home the need of adequate treatment of this disease as a State requirement, a factor in national efficiency.

The failure of the orthodox treatment of chronic aural suppuration is partly to be explained by the fact that it has hitherto been applied in the wrong place, owing to the prevalence of erroneous views regarding the relative importance of the pathological conditions which obtain in this disease. Treatment has hitherto been directed to the tympanum. In the following pages I have endeavoured to show that the mastoid antrum is always involved, and that treatment, to be successful, must deal with that cavity.

The unsatisfactory treatment of this disease at present in vogue also depends on inability to interpret clinical indications. In almost every case of this disease it is possible, by a careful study of the clinical signs and symptoms, to recognize with considerable precision the pathological conditions prevailing in those parts of the peripheral hearing apparatus which are hidden from view; and a correct knowledge of the changes which have occurred in

them, gives a clear indication as to treatment—as to *when* to operate and *how* to operate.

In my forthcoming work on aural suppuration, I endeavour to lay down rules for the guidance of the surgeon, and I am convinced that if the principles there enunciated are adhered to, an untold amount of deafness and chronic misery will be averted.

C. J. H.

LONDON.

February, 1916.



THE PREVENTION OF THE DEAFNESS AND MORTALITY WHICH RESULT FROM AURAL SUPPURATION.

A Paper read before the last International Otological Congress at the Medical School, Harvard University, Boston, Mass., U.S.A., August, 1912. Revised and with the addition of Notes, Illustrations, a Preface, and a Supplement.

Otology is the only branch of surgery in which practitioners appear content to continue to occupy a subordinate position in their dealings with disease; consequently operations upon the ear are usually characterized by failure to prevent deafness; indeed, the old ones were not designed with this object. If the surgeon does not acquire the mastery of disease, the patient is likely to suffer.

It is notoriously difficult to obtain precise details of the results of the various operative methods of treatment in ear diseases. An exceptional opportunity, however, has lately presented itself.

In the March and April * numbers of the *Journal of Laryngology, Rhinology, and Otology* there is published a report of the most important

* 1912.

part of the otological work of a large Hospital. Of its kind it is one of the most exhaustive which has come under my observation. It relates to the Ear Department of the Royal Infirmary, Edinburgh. A period of two years* is embraced in the report, which, in addition to other matters, gives statistics of the results of the mastoid† operations which were performed for the relief of aural suppuration and its complications. Excluding the few tubercular cases, it shows that there was a loss of life in 12 per cent. and a loss of hearing in 90 per cent.

This report was discussed at a meeting of otologists in Edinburgh, some of whom congratulated the authors upon their production, describing it as, and indeed it is, "a monument of patience and industry," yet no reference whatever was made to the high rate of mortality which the document records. This would appear to indicate that such a serious loss of life is the rule in these cases and not the exception, and that the mortality recorded in the report may be regarded as a fair sample of the results which are to be expected from modern otological practice in the treatment of this common affection.

Though the ability to hear is of great importance, there is no suggestion in the report that any of the operations were performed with the sole object of preventing deafness, nor, strangely enough, was this important matter referred to during the discussion. I cannot acquiesce in the obvious inference that in this disease the loss of hearing may be disregarded,

* 1910 and 1911. † See Figs. 1 and 2 on pp. 10 and 11.

and that only imminent danger to life should be held to justify surgical intervention in the form of a mastoid operation.*

A perusal of the numerous details given in this excellent report shows that the patients who died were in a desperate plight when operated upon ; it can therefore justly be asserted that they died in spite of operations, not in consequence of them. Indeed, prior to operative intervention, the condition of some of those who survived was so grave, that with less competent management there would doubtless have been a far greater loss of life. It is therefore evident, if the high mortality and enormous loss of hearing which this report records are to be diminished, that cases of aural suppuration must be sent to Hospital for adequate treatment at a much earlier stage than is the custom, *i.e.*, *before the hearing*

* This old view might have had some justification *when mastoid operations were far more dangerous than the disease they were meant to cure.* It is unjustified now, because operations upon the lines I have laid down are both safe and effective. Yet the old-fashioned attitude still prevails and as a proof it should be pointed out, that in the recently published descriptive catalogue of the temporal bones in the museum of the Royal College of Surgeons, many of which illustrate mastoid operations, the question of the preservation of the hearing by operation is entirely ignored. The catalogue is thus the means of perpetuating crude and discredited methods of operation which have not for their object the saving of the hearing, whereas it could and should have been made of some use in the way of *prevention* of disease and deafness and thus brought into harmony with the trend of the times. The custom, in cases of aural suppuration, of waiting until the hearing is destroyed and life endangered by acute mastoiditis, sinus thrombosis, meningitis, or brain abscess, before performing a mastoid operation is bad ; for if at this late stage the surgeon succeeds, an ear is lost, if he fails, a life.

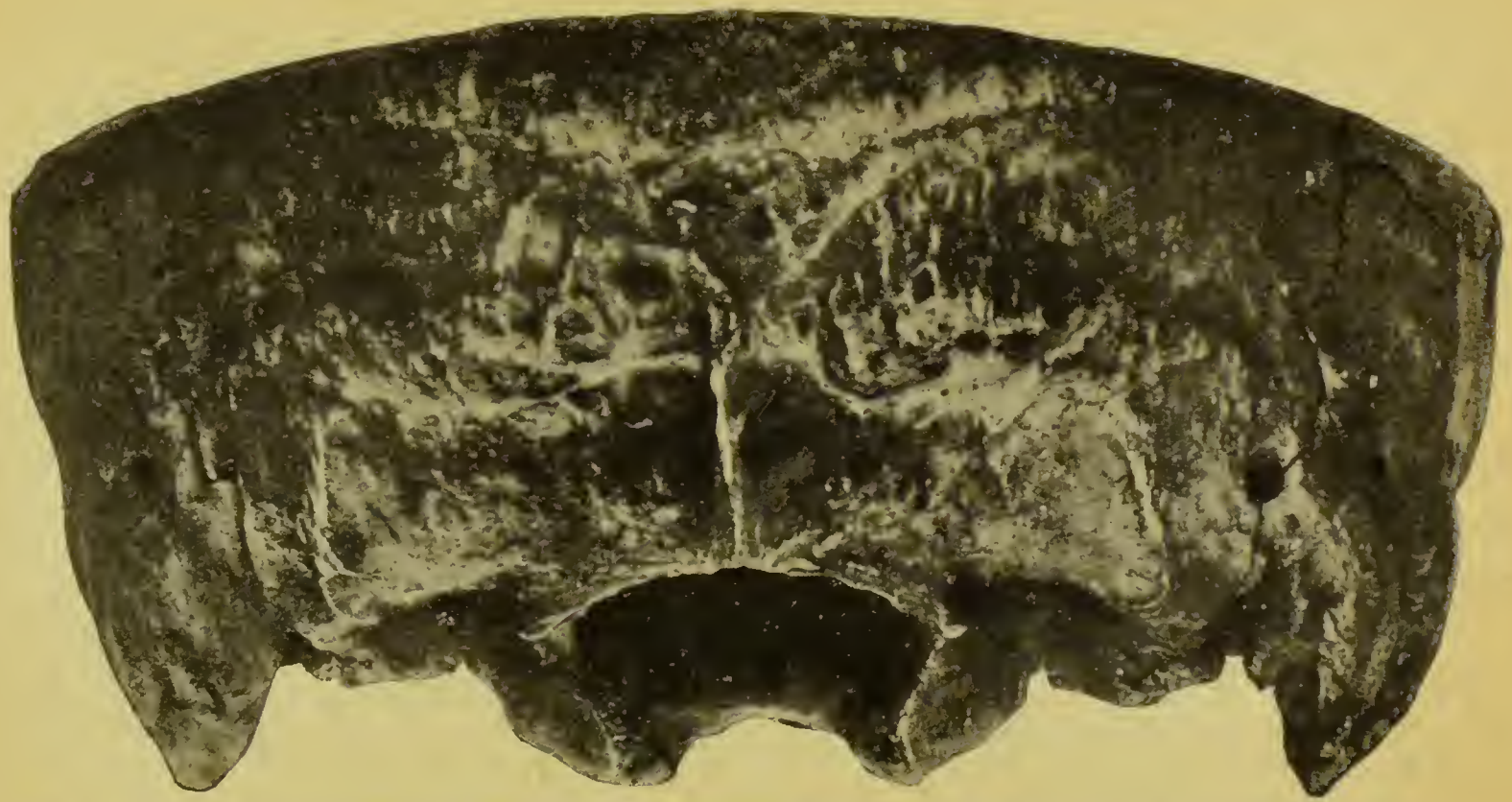


FIG. 1. The lower half or base of a skull viewed from behind and showing the large mastoid process on each side.



FIG. 2. The same specimen, photographed from a different aspect, in order to illustrate the origin of the word *mastoid* (breast-like) from its resemblance to the female breast.

has been lost. No other department of otological practice appears to be in such urgent need of radical amendment as that relating to the early management of aural suppuration.

It is of no use endeavouring to save the hearing of an ear which has already been destroyed by disease, or attempting to save a life which is beyond recall. Like appendicitis this likewise dangerous affection needs treatment of a certain kind at a certain stage in order to ensure success.

Dilly-dallying in the orthodox way with lotion, powder, or syringe, no one of which reaches the chief seat of disease, *i.e.*, the antrum,* cannot any longer be regarded as a rational proceeding. Because the statistics which I have collected and placed in the accompanying schedule, prove conclusively, that this dangerous cavity is always† involved in aural suppuration, and consequently that attention must be concentrated upon it, if treatment is to be successful.

If we call ourselves aural surgeons, let us operate when necessary to prevent deafness, else we are sailing under false colours.‡ A comparison of the

* See Figs. 3 and 4 on pp. 18 and 19.

† See note p. 21.

‡ The non-operative treatment of chronic aural suppuration, if *treatment* it can honestly be named, leaves these cases practically uninfluenced by remedies, and those who recover under it are cured by Nature's efforts. It is a hopeful sign, however, that an increasing number of aural surgeons are supporting me, *are discarding tradition*, and are operating when necessary in order to save hearing. In a paper read at the Annual Meeting of the American Otological Society at Washington on May 7, 1913, Doctors Plummer and Mosher, Surgeons to the Massachusetts Eye and Ear Infirmary, Boston, wrote as follows: "Finally, and this observation brings up another point in connection with Mr. Heath's operating, we are under

statistics referred to, which embody the results of the prevailing teaching, with those in the schedule which illustrate the results of my own, will prove that the present custom of withholding these cases from the specialist until hearing is past saving in 90 per cent., and life itself is lost in 12 per cent.,* is opposed to the welfare of

great obligations to him for reviving the question of operating early, both in acute and chronic cases, in order to preserve as much of the hearing as possible." ("Annals of Otology," March, 1914.) Considerable interest having been taken by American otologists in this direct and conservative method of arresting aural suppuration and thus preventing deafness, I was invited by the authorities of the last International Otological Congress, which was held at Boston, U.S.A., in 1912, to bring my instruments and operate during the meeting. They also arranged with the officials of the Massachusetts Eye and Ear Infirmary in that city to grant me the necessary hospital accommodation. I accordingly performed several of the conservative mastoid operations referred to herein before the members of the Congress, and gave daily demonstrations in the wards of the painlessness of the after-dressing and the manner in which the operation had been devised to facilitate this desirable object. With regard to the after-dressings Doctors Plummer and Mosher wrote also as follows: "For the first week after Mr. Heath's operation it is a surgical pleasure to look through the widely open canal and to see in the field, behind and above, the round opening of the antrum, and in the front the whole of the drum, while between the glistening bone of the bridge stands out sharply. The pleasant impression produced by this is increased when one looks behind the auricle and sees the almost invisible scar. One is impressed agreeably, also, by the fact that there are no wicks to be put in and taken out through a gaping posterior wound. Everything is done through the canal." After my departure some difficulties arose, which my previous experiences might have obviated.

* The gravity of these facts is obvious. Yet, it is the *system* which is at fault. There must be a change in otological teaching, and effective treatment, by operation if

the community. An immediate change, therefore, in otological teaching * regarding the stage at which these operations should be performed, is demanded in the interests of humanity and for the reputation of otology.†

Not long ago the mortality after operations for appendicitis was as high as that after the mastoid operations to which reference has just been made. It is much reduced now. A simple explanation of the means whereby this desirable reduction was

necessary, must be ensured before disease has caused irreparable damage. To be compelled to conform to orthodox text-books, whose writers, more learned than wise, like the Medes and Persians, persist in attempting to bind us with irrational rules, which discourage operations upon the mastoid in cases of aural suppuration—*i.e.*, mastoid disease—until deafness has become inevitable, however skilful the operator may be, is cheerless work for the surgeon who has any consideration for his patients, or pride in the result of his labour.

* Hitherto this erroneous teaching has been accepted because it has not been challenged, its futility proved and its disastrous results demonstrated. Some time ago a lady came to consult me about a discharge from one of her ears which had persisted for many years. She had been treated in the futile, old-fashioned, orthodox way with spirit drops, lotions, and syringing. I told her she must have a mastoid operation performed if she wanted a cure, and that it ought to have been done many years before. A month later, when she was leaving for home after her recovery from the operation, she said, "One month of the treatment I have endured for eight years and which did no good, was more painful than the operation which has cured my ear."

† The mortality which results from aural suppuration at the Throat Hospital is greater than that from all the other diseases which are treated there, added together. The patients come too late ; they have not been led to believe that a discharging ear is a danger to life or even to the hearing.

effected has recently* been given by Dr. Crawford Renton, surgeon to the Western Infirmary, Glasgow. In a short note on the "Mortality after Operations for Appendicitis," he writes :—

"Thanks to the promptitude with which medical men have cases of appendicitis operated on, the mortality is very much less than it used to be. Looking over the last 281 cases operated on in the quiescent stage, I find that no death occurred from the operation. A case of sudden death took place three weeks afterwards, but this is fortunately a very exceptional occurrence at so late a stage.

"The last 93 cases of appendicitis with abscess formation, which were all operated on promptly, recovered. One case, which was not operated on until septic absorption had taken place to a considerable extent, died. It is satisfactory to find that the number of cases of general peritonitis sent to be operated on has greatly diminished during the last three years, and when sent they are at a much earlier stage, and recovery therefore is much more certain. Where patients have passed the third day of their illness the mortality is very high ; when operated upon on the first or second day, the mortality is frequently as low as 2 per cent."

Dr. Renton's note shows, that private medical practitioners, by insisting on surgical assistance at an earlier stage, have wrought a revolution in the mortality from appendicitis and saved a great number of valuable lives. The same

* *British Medical Journal*, March 16, 1912, p. 607.

body of medical practitioners may bring about a similar beneficent revolution in regard to aural suppuration, by insisting on a change in the stage at which intervention shall take place, and thus save the hearing and the lives of thousands every year.

In my Presidential Address before the West Kent Medico-Chirurgical Society as long ago as 1907,* on "The Duty of Restoring Hearing by Operation in Chronic Aural Suppuration," I spoke plainly on the urgency of this matter, and commenced my Address in the following terms :—

"Aural appendicitis is the name by which chronic aural suppuration might be known, for disease of that mucous cul-de-sac, the mastoid antrum or appendix of the ear, is responsible, according to my investigations, for the perpetuation of the discharge. Like appendicitis in the abdomen, that in the ear is a latent danger. In both situations it is a grave disease on account of its liability to infect neighbouring vital parts. In the abdomen it may cause local abscess or fatal septic infection of the peritoneum (peritonitis); in the ear it may cause local, or cerebral, abscess, or fatal septic infection† of the jugular vein, or the pia mater

* *British Medical Journal*, July 13, 1907.

† All ears, like all noses, appear to be infected with micro-organisms, though but few are diseased. This opinion is not expressed without strong evidence. In order to settle this point I carried out many bacteriological examinations of middle-ear mucus (the tympanum being approached through the cranial cavity so as to avoid the possibility of contamination), removed from the healthy ears of people who had died suddenly through accident or hæmorrhage, also from

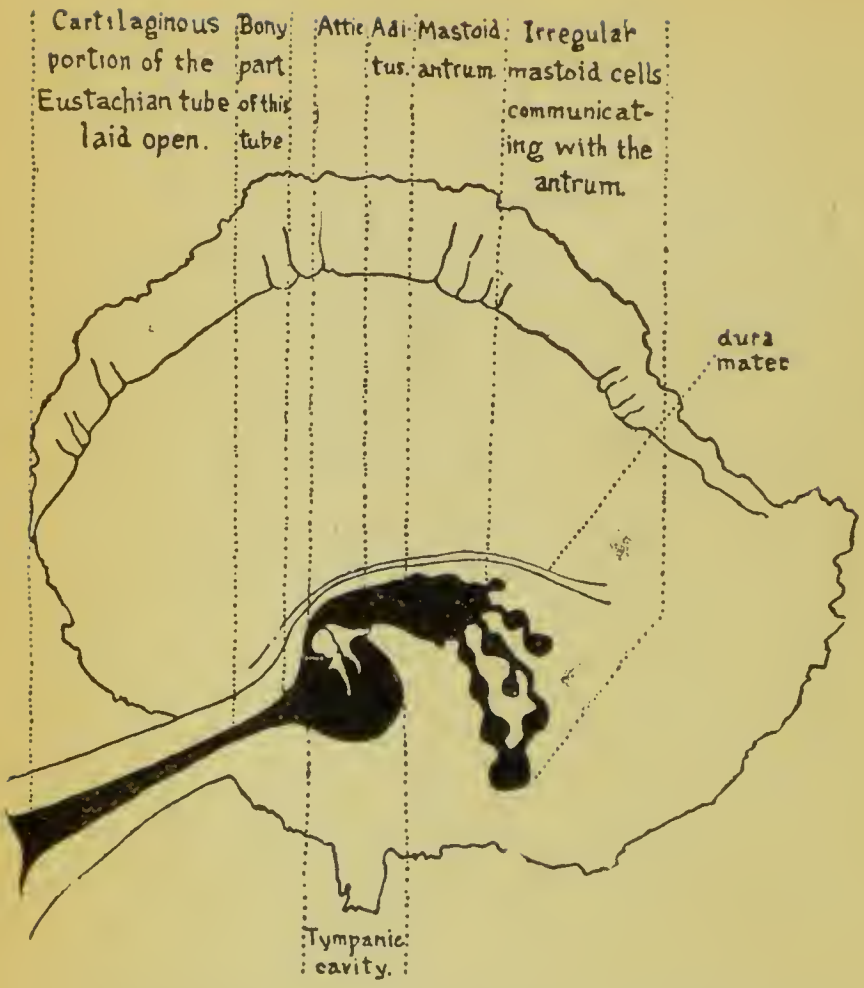
(meningitis). Now no careful surgeon waits for abscess in abdominal appendicitis, nor in my opinion should he wait for it in the ear; for just as removal of the abdominal appendix will eradicate the danger there, so will timely elimination of the aural appendix usually restore the ear to function and to safety." *

the healthy ears of many of the lower animals immediately after death. All these healthy ears were infected with micro-organisms mostly of the pyogenic kinds. It would appear, therefore, that wherever air penetrates microbes are to be found. These examinations were conducted by skilled pathologists, and in many instances control cultivations from the opposite ears were made by other observers at my request. Although every ear was found to be infected, the organisms usually differed in the two ears of the same individual. The mere presence of a pyogenic microbe, therefore, does not appear more likely to cause disease in a healthy ear than in a healthy nose or windpipe, or, indeed, in any healthy mucous membrane. All the healthy ears I examined were infected; it is evident, therefore, that something besides infection is required to start disease, though the books state that infection is the cause. The inhabitants of a town probably draw pyogenic organisms into their nasal and bronchial channels at every breath, yet their mucous membranes, if healthy and well supplied with ciliated epithelium, usually afford adequate protection and transmit the organisms to the gullet, whence they travel to the stomach, where they are destroyed by the acid gastric juice.

These observations with regard to tympanic infection were made by me between six and eight years ago. In *The Lancet* of January 24, 1914, Sir R. Douglas Powell, writing on the use of vaccines in pneumonia, used these words: "It is now well known, owing to the observations and experiments of Netter, Bejançon, and Griffon, with others, that the majority of healthy people in civilized communities have the pneumococcus amongst other organisms with virulent possibilities always more or less present in their naso-pharyngeal and buccal cavities."

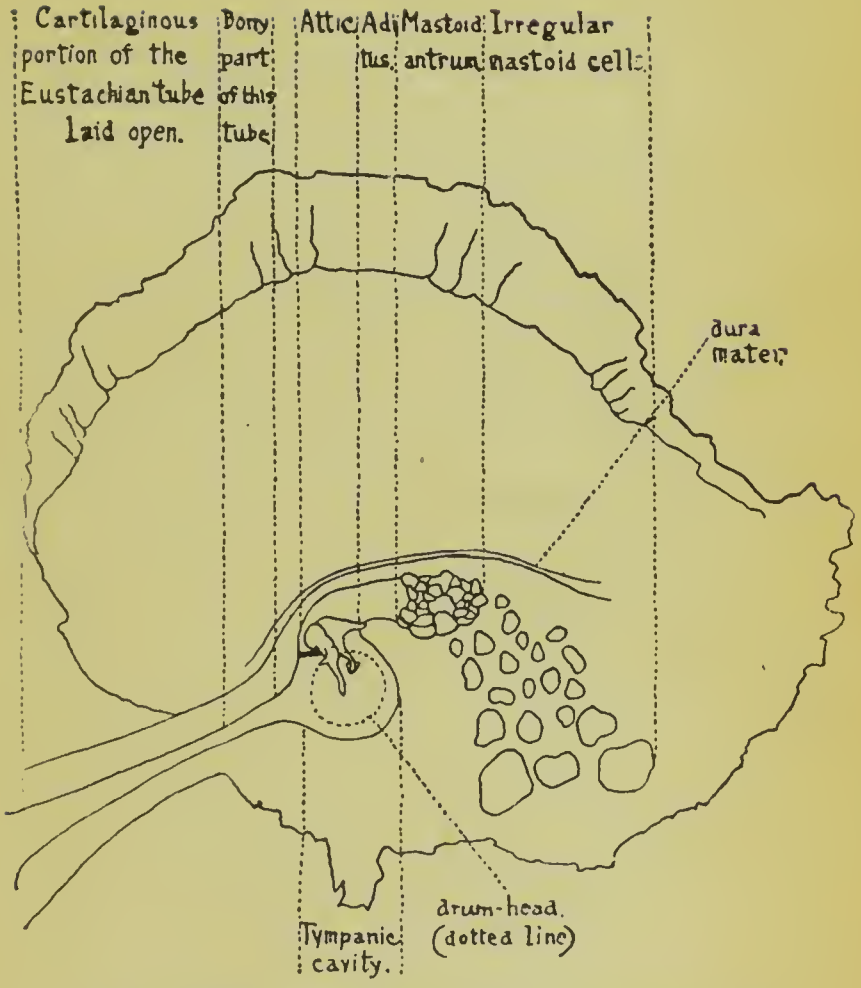
* *British Medical Journal*, July 13, 1907, and "Annals of Otology," September, 1907.

FIG. 3.



The ramifications of the air channels of the middle-ear shown (in black) in Fig. 3 are copied from a bone in the writer's possession. In the majority of cases, however, the air in the mastoid antrum is not, as here depicted, in direct communication with cells or sinuses extending far down towards the tip of the mastoid process; the conditions more closely resemble those depicted in Fig. 4, though no two middle-ears are exactly alike even in the same individual.

FIG. 4.



A diagram of the temporal bone, showing the size and situation of the middle-ear.

These words contain a clear expression of opinion, and one which was founded upon no inconsiderable experience, that *disease in the mastoid antrum is the usual cause of perpetuation of suppuration in the tympanum.** The accuracy of this view was contested at the time of its publication; doubtless by some it is still contested. The Edinburgh report, to which I have just referred, and the records of those other surgeons whose names and statistics are comprised in the schedule which I have drawn up, however, fully endorse my opinion, for *not in one of the 739 mastoid operations tabulated there was the mastoid*

* Indeed, the so-called attic disease of the text-books is merely mastoid disease draining by an unusual route, a route which in these cases (about 3 per cent.) is the direction of least resistance. This is proved by numerous operation cases quoted in my forthcoming work on aural suppuration, and in an article of mine in *The Lancet* in 1907, in which I described a case of this kind, and stated that attic disease is really mastoid disease, "and it should so be named." I have also shown cases of so-called attic disease at the British Oto-Laryngological Society in which cure has resulted from operation upon the mastoid antrum, the attic being untouched. Further, at the last International Otological Congress, when reading a paper upon the occurrence of early cholesteatoma in cases of aural suppuration—a condition most destructive to the hearing and not previously described or referred to in otological works—I described the route of drainage in those cases of mastoid disease which have hitherto been misnamed attic disease. I also exhibited some recent temporal bones to demonstrate the route. Show me a case of so-called attic disease (*i.e.*, discharge escaping through a perforation in Shrapnell's portion of the drum-head), and I will, by performing a mastoid operation, prove that there is disease in the mastoid antrum. In my pathological collection there are several specimens of *diseased antral walls* removed from patients upon whom I operated for the cure of what *the books call attic disease;* some of these are illustrated in my forthcoming work.

antrum found to be healthy. The results of my observations to this effect were published in the years 1906 and 1907.* Since that time I have been unable to discover a single authentic exception to this rule. I therefore feel justified in regarding it as an axiom, that a persistent discharge from the ear practically always indicates disease in the mastoid antrum.

If, then, this great principle be accepted (and after a careful perusal of the schedule it is difficult to imagine upon what grounds it can reasonably be any longer contested), surely the prolonged treatment of suppurating ears by syringing, powders, or lotions, under the old and erroneous belief that the disease is tympanic and that the mastoid antrum is not involved, can no longer be justified. Obviously therefore early operative eradication of the diseased walls of the suppurating antrum itself is demanded in the patients' interest, and demanded before, not after, the irritating discharge given off from that cavity has led to such serious changes in the mechanical structures† in the

* *The Lancet.* Many years ago I realized that the mastoid antrum, when the seat of chronic disease, was often so devoid of blood vessels that naked-eye identification of its involvement could not be relied upon. Therefore, in order to obtain indubitable evidence regarding its condition in these doubtful cases, I sought the assistance of experienced pathologists, who made a large number of examinations of the bone and other tissues removed from the walls of the cavity during my mastoid operations. Their reports, which are still in my possession, are embodied in the schedule, and are there endorsed by the more recent observations of other surgeons.

† The mechanical arrangements in the tympanum are nothing short of marvellous. Though the cavity is not as large as the half of a half-inch cube, I have observed the

tympanic chamber (through which it passes) as must result in permanent deafness.

During the years 1906 and 1907, in consequence of my publications* insisting upon the earlier performance of mastoid operations, in order to prevent the loss of hearing as well as life (wherein numerous instances were quoted which afforded proof of the wisdom of this course), many otologists attended my operations at the Throat Hospital and afterwards entered with me into a full discussion of this subject. The evidence which I was then able to produce led them to adopt my mode of operation. In response to recent inquiries some of their statistics have reached me. These, for convenience of comparison, have been placed in a schedule with those of the Edinburgh Royal Infirmary and with mine. It would take years to reproduce the other details as fully as they are given in the admirable Edinburgh report; little more than the statistics relating to mortality, therefore, can be compared.

equivalents of the following: balance weights, light reciprocating parts, universal joints, cardan shaft, enclosed crank chamber, surface and forced lubrication, governing and acceleration. The delicate adjustment of these structures is easily deranged by inflammation; the result is more or less deafness. A large proportion of those who become deaf by the time they are twenty years old, have suffered in childhood from inflammation of the middle-ear, which has not gone on to perforation of the drum-head and discharge. This suggests, when spontaneous perforation does not occur in a case of otitis media, that early paracentesis would hasten the drainage of the cavity and tend to prevent subsequent deafness.

* *The Lancet* and *British Medical Journal.*

The most notable feature in the schedule is the disparity in the mortality at the various Institutions. At the Royal Infirmary, Edinburgh, the ratio of mortality to operations was 45 times as high as that at the Throat Hospital, London. This contrast is attributable to the different stages of the disease at which the patients underwent operative treatment at the two Institutions. The majority of the Throat Hospital patients, referred to in the schedule, were under my observation and treatment for some time before operation, whereas many of those treated at Edinburgh came from remote rural districts and were not sent to Hospital until their condition was critical, when they had moreover to undertake a long journey, which necessitated further delay. The small mortality of 1, in 360 operations* at the Throat Hospital, proves, that a mastoid operation, if performed when dangerous symptoms first appear, is a remarkably safe proceeding as far as life is concerned, though usually it will be too late to save hearing. Unfortunately cases of this kind, as already pointed out, are not regularly sent to the surgeon early enough to prevent a serious loss of

* Owing to the small mortality among my mastoid patients at the Throat Hospital, it is obvious that but little information could be derived from post-mortem examinations. Some of the steps in my conservative operation, therefore, were devised with the object of enabling me to see the pathological changes which had occurred. Further, the accurate information concerning the condition of the ear obtainable in this way, supplemented by the subsequent history of the case, has already provided far more instruction regarding the pathology of the living, than could be afforded by any number of post-mortem examinations.

Source of Statistics.	Total No. of Mastoid Operations.	Total No. of Deaths.	Proportion of Deaths to Operations.	No. in which disease in the Mastoid Antrum was observed.
Drs. Fraser and Milne Dickie, Royal Infirmary, Edinburgh. Published in *Journal of Laryngology and Otology*, March and April, 1912.	110 (in the years 1910 and 1911)	14	1 in 8	All
Dr. John Bower, Eye and Ear Hospital, Cheltenham.	61 (about 3 years)	3	1 in 20	All
Dr. Percy Jakins, Central London Throat and Ear Hospital.	100 (last 100 cases)	3	1 in 33	All
Mr. Adair-Dighton, F.R.C.S., Eye and Ear Infirmary, Liverpool, The Toxteth Infirmary, &c.	103 (in last 12 months)	2	1 in 54	All In every case obvious. One case of only 2 days' duration.
Mr. Charles Heath, Throat Hospital, Golden Square, London. Since the writer's introduction of the Conservative Mastoid Operation (a period of about 4 years), the average duration of disease in these cases was 6 years. These statistics were kindly compiled from the Hospital records by Mr. George Baugerow, F.R.C.S., Surgeon to the Institution.	360	1	1 in 360	All Nearly all obvious to the naked eye, doubtful cases verified with the microscope as naked eye observations concerning this non-vascular cavity are occasionally misleading.

* All my (360) operations were commenced on conservative lines, yet one-third of them (119) were concluded in the radical manner. This proves that the information derived from the inspection permissible during operation by my method showed, that the disease was too far advanced for the possibility of perfect repair in one-third of these cases, and indicates that the operations were performed too late to save the hearing; yet they were carried out as soon as hospital accommodation could be found. My experience of prolonging the after-treatment in very long-standing cases of aural suppuration in which the conservative operation has been performed, has been most encouraging. this treatment having resulted in a further diminution of the proportion of cases which require the radical operation. In old-standing cases, therefore, the surgeon must not be impatient to bring his post-operative treatment to a close, if he wishes to achieve success by saving the hearing.

The proportion of cases of old-standing suppuration, with their tardy repair after operation, should automatically diminish as soon as the profession teaches the people the need of early treatment of aural discharges in order to save the hearing.

Various Types of Operation and Number.	Deaths after various types of Operation.	Remarks.
Schwartze ... 32 Radical ... 67 Modified Radical 11	5 9 0	At the time of these radical operations or subsequently, 15 of the patients underwent operations for dangerous intracranial disease, from which 9 of them died in spite of the operations.
"Heath's Conservative" 54 Radical ... 7	0 3	The 3 patients who died were in such a critical condition at the time of the radical operations that intracranial measures were at once carried out, but were too late to save life, as in the cases referred to above.
"Heath's" ... 52 Radical ... 43	0 3	Three of the 48 patients who underwent radical operations were suffering from grave intracranial disease when first brought to the Hospital, and died, like the cases referred to above. The operations were too late.
"Heath's" ... 70 Radical ... 38	1 1	The death of the two patients in this series appeared inevitable at the time of their admission to Hospital. It was, however, considered a duty to operate, as occasionally an apparently hopeless condition is recovered from.
The Writer's "Conservative" Operation † .. 241 Radical ... *119	1 0	This single death was due to meningitis. As no post-mortem examination was made the route of invasion was not identified. Neither the meninges, the labyrinth, nor the lateral sinus, was exposed at the operation. There was probably some latent disease in the labyrinth, as both ears had been discharging for about 30 years. The operation was undertaken too late

The average duration of disease in my 360 cases was six years. This is far too long to wait, if the hearing is to be uniformly restored; indeed, after three months of continuous suppuration, so much damage will have occurred, that perfect repair will be impossible in the majority of cases, no matter what operative or other treatment is adopted. It is obvious, therefore, that operation should not be delayed for three months. Further the tympanic changes engendered by suppuration which is allowed to persist for three months are liable to lead to more rapid deterioration of the hearing than that which naturally takes place as age advances, just as sight deteriorates. Rarely, indeed, should suppuration be allowed to continue for more than three or four weeks.

† This operation is described and illustrated in my work on aural suppuration, which is now in the Press. Having performed as many as 33 mastoid operations in hospital and 20 elsewhere, in one month, and carried out the after-treatment myself, I have had opportunities of discovering what steps are essential I have also made a careful study of the means of shortening the duration of this operation, and in consequence have been able to perform as many as seven in a morning, *i.e.*, between 9 and 1 o'clock The average duration, of the actual operations in these cases, was only 22 minutes.

life and hearing.* Responsibility for the successful treatment of early cases, therefore, usually rests with the family doctor. He it is who holds the reins at that early period of the disease when the opportunity to save life and hearing is greatest. But he, not being a specialist, is largely dependent in this matter on the guidance to be derived from text-books,† all of which are grievously inadequate

* Sometimes a suppurating ear will escape serious injury for many years. A remarkable instance of this was shown by me at a meeting of the British Oto-Laryngological Society two years ago. The patient, a woman, was sent to me at the Throat Hospital by Dr. Meggison (now of Dorchester). She had suffered for forty years from suppuration in both ears, in spite of continuous treatment of the orthodox, painful kind. The perforation in the left drum-head was so large that one-third of that membrane had been destroyed; the other had two large perforations in it. I was asked if mastoid operations would cure the severe headaches from which she had always suffered and which had rendered her a chronic invalid. Knowing how often aural suppuration is responsible for headaches, and how frequently they cease when the disease is cured, I advised operation. The results justified my belief, for the relief from headache was immediate. The large perforations in the drum-heads also healed completely on both sides. On both sides also there was complete restoration of the hearing. Dr. Frederick Spicer, of the Metropolitan Ear and Throat Hospital, who was in the chair, stated that these were the best results of mastoid operations he had ever observed.*

† Our endeavour should be to arrest suppuration, by the conservative mastoid operation if necessary, at a stage in the disease at which complete recovery of hearing is at least probable. The classical symptoms which text-books give as indicating the necessity for mastoid operations are usually not forthcoming until hearing has been destroyed and the patient's life become endangered; indeed, death

* Transactions, British Oto-Laryngological Society. See also *The Lancet* and the Medical Press.

as regards the pathology and treatment* of this disease *during its early stage*, which is indeed the only stage in which perfect repair is likely to be effected.

often occurs without their appearance. Writers of text-books should either give more explicit information, or state plainly that the treatment of this disease should be relegated to the specialist. To issue books which induce the family doctor to believe that drops or powders, when placed in the meatus, will cure disease in the mastoid antrum (for the latter cavity, as I have proved by the schedule, is practically always diseased), is to mislead him. It is a practice which often entails the sacrifice of hearing, occasionally of life. The hearing of the majority must no longer be sacrificed to a belief in the prevalence of a pathology which only exists in the few. It required years after its introduction before the operative treatment of appendicitis became general. I fear, therefore, that it may also be long before the conservative mastoid operation becomes the routine treatment in obstinate cases of aural suppuration, for which it is by far the most, if, indeed, it is not the only, effective remedy. If, as is often the case in this disease, operation is required in order to save life, it assuredly ought to be performed in time to preserve the hearing too.

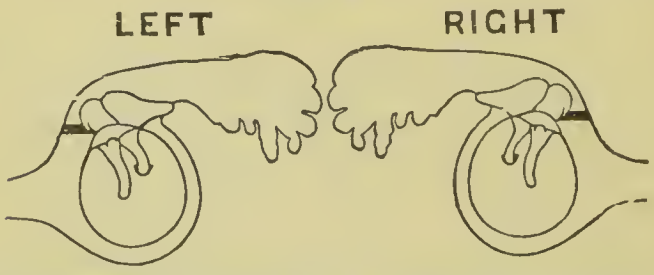
In the early days of this disease patients should be confined to bed and have their heads wrapped up. Four out of five recover without any other treatment (and this fact has led to the erroneous belief, that when the ear is syringed and drops are used, these applications have cured the mastoid disease). The fifth needs prompt and careful handling, and *is the one which really needs treatment and*

* Confinement to bed with the head raised and wrapped up and warmth applied to the affected ear, a light diet, gentle aperients, alkaline medicines, and above all early incision of the drum-head within an hour or two of the commencement of pain, or if there be bulging of this membrane, will do more to relieve the pressure of the septic fluid and prevent involvement of the cancellous walls of the mastoid antrum and consequent persistence of disease, than any other treatment which I have tried or heard of, including vaccines, which, by the way, have rarely any effect whatever. Should adenoids be present they will need attention.

In the Edinburgh report the various operations are referred to as Schwartze's, the radical, or the modified radical. This method is not followed by the surgeons responsible for the other statistics given in the schedule. They have adopted my suggestion and divided their cases into *two categories having reference to the prospect of the restoration and preservation of useful hearing*, viz., into curable (or probably so) and incurable. When the examination of the antrum and tympanum afforded by my conservative operation showed that there was a good prospect of saving the hearing after

to which this article chiefly refers. All these cases, however, should be closely watched so that the serious ones may be recognized and adequately treated. A daily chart of the hearing should be made by the surgeon himself after he has cleared the ear thoroughly and inspected the drum-head, a diagram of which should be kept as a guide in the progress of

FIG. 5.



This diagram is made with a rubber stamp which I have designed in order to save time when taking notes of cases.

the case. All this is necessary, because the invisible changes in the tympanic mucosa in early cases cause far more interference with the hearing than the visible perforation of the drum-head. Practically always within three or four weeks, and occasionally within as many days, the competent surgeon will be in a position to say whether the conservative mastoid operation is required in order to save the hearing, or whether a spontaneous cure is probable.

eliminating the antrum and purifying the tympanum, the ear was regarded as *curable*, and the conservative* measure was relied on. When, however, the conservative operation revealed tympanic conditions which were beyond repair, the ear was regarded as *incurable*, and the operation converted into a radical one.† With the exception of the 110 patients treated at Edinburgh, the conservative operation was at first adopted as a routine proceeding in every case in the Schedule (629). After the exposure and examination of the middle-ear

* Early conservative mastoid operation is permissible if greater certainty of preserving the hearing is thereby assured; indeed, under these circumstances, it must ultimately become the rule; whereas early operation by the radical method, *which inevitably leaves some deafness*, is not to be thought of. The conservative operation requires great accuracy; this, and completeness of repair, are more important and far more difficult to ensure in operations upon the ear, than in operations elsewhere. In some cases mastoid operations require as much precision as those upon the eye, while at the same time they are performed under far greater difficulties.

† Allusion may here be made to the fact that I have seen several soldiers who have been sent home from the front as unfit for service, in consequence of increased deafness due to gun-fire, their ears having previously undergone operation by the radical method; whereas I have not yet seen any so invalided who have been treated on the conservative plan. Yet I have operated by the latter method on several officers and men in order to fit them for military duty. This would appear to prove that the drum-head, which is retained in the conservative operation but removed in the radical one, *affords some protection to the hearing.* As the best hearing I have ever observed after the conservative operation (when tested with the watch) was precisely six times as good as the best I have ever observed after a radical one, it is obvious that *the drum-head is of great assistance to the hearing; it should therefore be preserved.*

(which my conservative method permits and which Schwartze's* does not) had been effected, the surgeons were in possession of the information necessary to enable them to decide whether enough had been done and the ear now had a prospect of complete recovery, or whether, on the other hand, the tympanic disease was so extensive as to render it desirable to take the few extra steps necessary to convert the conservative measure into a radical one. In other words, they were not rendering an ear permanently defective by the radical operation without adequate information; by adopting my method they acquired the fullest attainable knowledge of the state of affairs in the tympanum. The result is shown in the schedule.

* A Schwartze operation for acute mastoiditis may be described as the opening and draining of an acute abscess in bone. This method of operation does not necessarily include the removal of the structures responsible for the trouble; therefore recurrences, or failures to arrest disease, are frequent. Twice within a fortnight have I been called upon to operate, for the relief of acute mastoiditis, upon patients who had previously suffered from this affection in the same ear, and had then undergone operations by Schwarte's method at the hands of other surgeons. In neither instance had the dam, the cause of the acute disease, been removed at the first operation, yet by the different technique of my operative method I was able to remove it in both cases, without injury to the hearing. On several occasions I have also been called upon to operate for the relief of acute mastoiditis which had arisen in ears upon which the operation of ossiculectomy had previously been performed. This fact shows that the removal of the ossicles, though it damages the hearing, does not put an end to the suppuration, or even render the life of the patient safe. It is a sacrifice of something of value without a certainty of any compensating advantage.

In 1900 Dr. Percy Jakins, surgeon to the Central London Throat and Ear Hospital,* published his experience of 80 "Stacke" (radical) operations (*The Lancet*). In the text of his article it is incidentally mentioned that he had in the same period performed 42 "Schwartze" (cortical) operations. *These were the two methods of mastoid operation in use at that time: no others were described in text-books.*

Though I devised and performed a "conservative" mastoid operation for the cure of chronic disease as early as 1902,† it was not until 1906 that I decided to institute the measure as a routine proceeding. This was done for the purpose of facilitating the access to, and examination of, the tympanum, with the object of thus ensuring a full knowledge of its condition before condemning any diseased ear to some permanent deafness by the radical mastoid operation.‡ Dr. Jakins was one of the first to visit the Throat Hospital and investigate

* Now consulting surgeon. He has recently been called back to active duty at the Hospital, some of the younger members of the staff being on military duty.

† See *The Lancet*, August 11, 1906.

‡ In early cases of mastoid disease which are obviously not recovering, the following question arises—Is the ear capable of spontaneous recovery, or does it require the help afforded by the conservative mastoid operation? In late cases the long duration of disease indicates that an operation is required, for people cannot be allowed to remain diseased and in danger all their lives; the question in a late case, however, is a different one, and is to the following effect—is it too late to save the hearing? My method of operation was designed to settle this point judiciously, by providing the information upon which a proper decision can be founded.

the precise details of the measure I had devised. After watching two operations he grasped the purport of my innovations and expressed the opinion that my operation would take the place of all the Schwartze and most of the Stacke operations ; and it seems likely that this view will prove to be correct, for it will be observed on referring to the schedule, that in his practice, in mine, and in those of other surgeons, my operative method has already displaced Schwartze's entirely, and Stacke's (radical) measure extensively.* The schedule further

* From the schedule it will be gathered that over three years ago Dr. Jakins performed rather more than one-half of his mastoid operations by my method ; he has recently informed me that as a result of further experience of its advantages he has now reached a stage when just 75 per cent. of his operations are thus performed. His prophecy, made in 1906, that my operation would take the place of all the Schwartze and most of the Stacke operations has therefore been fulfilled in his own time and in his own practice, for he now performs no Schwartze operations whatever, and most of the patients for whose treatment he formerly considered Stacke (radical) operations necessary, he now treats by my method, thereby saving their hearing. Having had similar experience, he is of my opinion, that if cases of mastoid disease (hitherto called aural suppuration) be thus treated early enough, hearing can usually be preserved. Further, Dr. Jakins has informed me, as have also other British and some American surgeons, that their patients recover most rapidly from mastoid operations when performed by my method. Their patients like my own have usually been well enough to go to their homes within a week of operation. Such rapid convalescence is of enormous importance in Hospital practice, especially in the Ear Hospitals of London which are so inadequately supplied with beds, for it enables the surgeons of those Institutions to treat two or three times as many patients as would be possible if operations were carried out by the older methods. This is tantamount to doubling or trebling the accommodation of these Institutions, without the expense

suggests that it is merely necessary to operate earlier, *i.e.*, before disease has destroyed the hearing, for my method entirely, or all but entirely, to displace the radical measure, too.* Unfortunately, in our London Hospitals the cases cannot always be operated on early enough owing to lack of accommodation. Only dangerous cases get admitted: life is saved, the hearing is not.†

The preservation of the hearing has hitherto received scant consideration in cases of aural suppuration.‡

which this extra accommodation would entail. Dr. Jakins, who has performed 800 mastoid operations, also tells me, that since he has adopted my conservative method the mortality after his mastoid operations has diminished, while the proportion of recoveries with good hearing, has greatly increased.

* An aural surgeon from South Africa, who recently brought his wife to me to undergo treatment for catarrhal deafness by the cantharidin method, while here witnessed several of my conservative mastoid operations. On leaving for home he informed me that he had written to his colleagues in Africa asking them to stop all mastoid operations except for acute disease until his arrival, *as he felt sure he had, by the radical operation, been destroying hearing which might have been saved by my conservative method.*

† Regarding the calamities which result from the lack of accommodation in the London Ear Hospitals, see the writer's work on "The Nature and Causes of Catarrhal, Throat, or Hereditary Deafness," Note 27, p. 45. A new edition of this work is now in preparation.

‡ One aural surgeon informed me that he did not bother about the hearing in cases of aural suppuration; presumably because the danger to life overshadowed, in his opinion, the danger to the hearing. Another said, "You take too much trouble with your mastoid cases. You will get no credit out of them whether you operate or not. It is a hopeless

My Hospital experience has shown, that, with the exception of those patients the condition of whose ears had become so dangerous to life as to demand early operative assistance, the saving of the hearing has been purely a matter of good fortune. The restoration of "normal or nearly normal" hearing in the Throat Hospital cases, was about three times as frequent as in those treated at Edinburgh, because operative assistance was afforded at an earlier stage. Yet even so there was a loss of hearing in over 70 per cent., which clearly indicates that operations were delayed too long. I desire to state with all the emphasis at my command, that if patients suffering from aural suppuration seek specialist advice early, it is possible to ensure the preservation of hearing

disease to have anything to do with." This was the experience of one who treated aural suppuration according to text-book methods and will surely be the experience of others who do likewise. A prominent American observer has stated that intracranial complications occur in over one per cent. of cases of aural suppuration. According to my observation acute mastoiditis, with its attendant dangers, is far more prevalent. Obviously then aural suppuration must be regarded as a dangerous disease. The statistics in the schedule on pp. 24 and 25 prove, moreover, that it is far more dangerous than an operation for its cure. I have also observed that over 50 per cent. of those ears in which the suppuration has persisted for three months never hear perfectly again. These dangers to life and hearing from aural suppuration surely justify the performance of the conservative mastoid operation as soon as the condition of the tympanic mucosa (as shown by a daily chart of the hearing), or the persistence of the disease for three or four weeks without signs of abatement, indicates that spontaneous cure with preservation of the hearing is improbable. Indeed, under such conditions operation is demanded, because I have shown it to be not ouly safe as regards life, but effective in preserving the hearing.

in about 90 per cent. of those who lose it while undergoing the orthodox treatment.*

A difficult problem, however, is involved in the treatment of these early cases.† For when operations are performed promptly enough to ensure the

* For orthodoxy there is but one excuse—the belief that it is founded upon truth and efficiency. When it ceases to justify this condition it sinks into a restricting rut, a real obstacle to progress. Rigid orthodoxy in any progressive science is out of place. So is the orthodox mind, with its narrow limitations and reluctance to recognize new facts. The blighting effects of orthodoxy upon otology and the dread of disagreeing with traditional teaching react disastrously upon the community. Further, the limited number of aural surgeons, resulting partly from the restriction of entry to the otological section of the Royal Society of Medicine, is baneful, and helps to deprive the people, from whom the Society's charter was received, of an adequate supply of competent aural surgeons. There is just now a serious shortage. The great Fever Hospitals of London, where cases of aural suppuration abound, have no aural surgeons on their staffs, yet specialists in ear diseases are greatly needed because the ear conditions are so liable to be overshadowed by others; the ears therefore receive less attention than they require.

† If the aural surgeon were to operate upon every case of otitis media, he would operate upon many cases which would otherwise recover spontaneously. This could not be justified. If, however, he waits and daily watches and tests the affected ear until the symptoms indicate that the disease is progressive, or until lapse of time shows that spontaneous cure is improbable (for a very large majority of those which recover spontaneously do so within three weeks), he will be disappointed to find that a small number have passed the stage in which the disease is curable by the conservative operation. These serious cases are usually incurable by any treatment but radical operation, and this entails the loss of hearing. I have claimed that 90 per cent. of those who now lose their hearing through unchecked aural suppuration are curable by means

safety of the hearing, it is possible that on rare occasions the surgeon may merely be anticipating a late though natural cure. This, however, is a contingency which cannot be evaded and must consequently be faced. Does not the general surgeon regularly face and decide such matters to the advantage of his patients generally by operating during the quiescent stage in cases of appendicitis, even though in some of these cases a spontaneous cure would

of my conservative method of mastoid operation, *if thus treated as soon as the symptoms or the lapse of time show that a mastoid operation is necessary.* I recently received a letter from a provincial surgeon in large practice, who considers my method of operation capable of curing more than 90 per cent. of these cases, for he writes thus: "I believe, and I now preach to all and sundry, that if your conservative operation were performed in every case on the first appearance of an acid-fast squame there would be no post-suppurative deafness to deplore." I do not go so far as this surgeon, because, in my examination *post mortem* of a very large number of healthy ears I have now and then found anatomical arrangements in the tympanum itself, which lead me to believe that if ears thus constituted were exposed to sepsis, as in otitis media, they would be likely to lead to such conditions as would in themselves perpetuate disease and end in destruction of hearing, even if the accompanying disease in the antrum were early eradicated by the conservative mastoid operation. Further, the mucus given off by the tympanic mucosa when irritated by certain microbes is so viscid, that the limited amount of ciliated epithelium with which the cavity is endowed, is quite incapable of passing it out through the perforation; irritation is consequently perpetuated and recovery prevented. Indeed, viscid secretion (not always due to the presence of streptococcus mucosus capsulatus) is far worse than infection with ordinary streptococci or even diphtheria. It is probably the greatest obstacle to the success of the treatment which I have devised for aural suppuration likely to be met with in early cases of this disease.

doubtless have taken place?* Are we less competent to decide and to act, when the ear and *its* appendix are involved? There can be but one answer to these questions. Surely it is better in a doubtful case (more especially if the second ear be defective) to act promptly, yet safely, by

* Experienced aural surgeons have all too rarely dared to differ from their teachers, and the community has consequently suffered.

Cases undoubtedly occur in which drainage from the mastoid antrum is dangerously impeded before, as well as after, the ear has commenced to discharge through a perforation in the drum-head. Doubtless a few of these cases recover without mastoid operations, but this fact by no means proves that the surgeon has acted wisely in withholding such treatment, any more than it would prove that undoubted appendicitis which had recovered without operation, had been wisely treated. For a recurrence is common in each of these diseases, and should the recrudescence happen at a time and in a place where no expert assistance or modern hospital equipment is available, it would be liable to prove fatal.

When a dangerous disease which imperils also the hearing is known to exist, even though it may, and occasionally does, subside, it is surely better to put life and hearing in permanent safety by an operation practically devoid of danger, than to withhold such assistance, even if apparently justified in so doing by a partial or temporary recovery.

The greatest field of usefulness at present open to the otologist is in the prevention of deterioration of the tympanic structures concerned with the transmission of sound from the air to the labyrinth. It is these parts which suffer in aural suppuration and in non-suppurative catarrh, and as nearly all deafness is due to these two diseases, they are of the greatest importance. Defects in tympanic structures can occasionally be cured by Nature—never by the surgeon alone, though he may assist. He will assist more effectively if he has a wide knowledge of the pathology of aural suppuration in its early stages.

operating and ensuring the preservation of the hearing, rather than run the risk of lifelong misery through deafness on the part of a patient, and lifelong regret on the part of a surgeon for the loss of an ear, possibly the loss of a life, certainly the loss of a great opportunity. *Otology is in need of some guiding principles.*

A SUPPLEMENT.

The finishing sentence of the preceding communication to the Congress proclaims a dearth of guiding principles in otology. The criticisms which this view called forth afforded me an opportunity of pointing out that the ears of some deaf people have not infrequently been examined by several experienced otologists, no two of whom could be found to agree either as to diagnosis, prognosis, or treatment. The explanation of this remarkable diversity of opinion regarding the nature and correct treatment of prevalent diseases of the ear, is to be found in the fact that otologists have hitherto omitted to lay down guiding principles to which all could reasonably be expected to conform.

The enunciation of principles is a necessary preliminary to progress, but great labour is entailed in the preparation of such abundant evidence as shall ensure their general acceptance. In the foregoing paper three guiding principles are formulated. The first, the most important, asserts *that the mastoid antrum should be regarded as diseased in all cases of persistent aural suppuration.* This important principle has not only been there advanced—that I had already done six years ago,*—but it has been proved, and proved far more

* *The Lancet*, April 27, 1907. The article began thus:—"There should no longer be any doubt of the fact that chronic suppuration of the middle-ear, if promptly treated, is usually curable, with restoration of hearing and with healing of the perforated drum membrane. It appears also that practically every man or woman who suffers from chronic suppuration of the middle-ear has disease of the

conclusively than the majority of those surgical principles have been, which have obtained general acceptance and afforded valuable guidance to the surgeon.

The second guiding principle formulated in that article, one which has likewise received adequate confirmation, is to the effect that mastoid operations upon chronic cases, when performed on the first appearance of danger, *are remarkably safe and successful proceedings as far as the preservation of life is concerned; but that in the majority of such cases the postponement of the operation until life is endangered entails the loss of hearing on the affected side.*

The third important proposition there enunciated, also entitled to rank as an otological principle because it is endorsed by the results of operations, is the assertion that *Schwartze's old operative method, originally designed for the relief of acute disease in the mastoid antrum, is inadequate for the purpose of preventing deafness.* It is inadequate because *it is not planned so as to afford access to the tympanum*, and therefore fails to provide the surgeon with the information which he must obtain, if his operative proceedings are to accord with the pathological conditions prevailing *there;* for it is partly upon the appropriate treatment of these conditions that the preservation of hearing depends.

mastoid antrum, and although occasionally the discharge may cease with or without treatment on account of a favourable anatomical formation of the antrum and aditus, this fact does not invalidate the contention that while there is chronic suppuration there is disease of the mastoid antrum. These statements are founded on the experiences of over 500 mastoid operations performed during the various stages of this disease, and in all those patients not in one instance was the mastoid antrum in a condition of health."

The recognition of these three principles will doubtless afford some guidance to the aural surgeon. Valuable help as to treatment is also to be derived from a careful study of the pathology of the early stages of aural suppuration; *and let it never be forgotten that pathology is the foundation of all sound and successful surgical procedures.* Moreover, the indications for the performance of the conservative mastoid operation* in order to

* That is, the diagnosis of the conditions which justify the conservative mastoid operation in order to prevent deafness. We cannot precisely gauge the intensity of the morbid process, for we cannot see what is going on in the antrum, a cavity which is proved by the schedule (pp. 24 and 25) to be uniformly involved, nor can we gauge the virulence of organisms (say of the various strains of streptococci) by gazing at them through a microscope; but *we can measure the amount of defence* (vascular swelling of the tympanic and attic mucosa) *which Nature considers appropriate*, from the interference which it causes with the hearing and drainage. The amount of the interference with hearing (degree of deafness as shown by the watch) and drainage (pain) which Nature's defence (swelling of the attic tympanic and Eustachian mucosa) causes, I have long observed to be the earliest and the most reliable guides as to the urgency of the need of surgical assistance. This has therefore been my teaching for several years. It is usually upon the diversity in the symptoms resulting from the variable position and amount of this swelling, that the diagnosis of tympanic conditions and changes must in early cases depend, if our opinions are to have a sound foundation, and are to be something more than *the mere guesswork* which has hitherto passed muster as scientific diagnosis, and has resulted in the unnecessary loss of innumerable ears and lives. The physician cannot see the state of a lung, say in pneumonia, but Nature's defensive swelling and exudation give rise to signs and symptoms; and by means of these he can estimate with fair accuracy the extent of the lung involved and the stage of the disease. In like manner, by the method which I have devised, practically tested (as can be seen from a perusal of the cases in the Appendix of my forthcoming work

arrest disease in the mastoid antrum and thus prevent tympanic injury and deafness, have far too long been awaiting consideration. Space for this important matter is not available here. It was my intention to have presented it to the Otological Congress at Boston,* and I gave notice of my intention so to do, but stress of professional work prevented the completion of the project.

on aural suppuration), and demonstrated to hundreds of aural surgeons at the Throat Hospital immediately before the operations at which the diagnoses could be verified, I find it is possible to estimate the amount and locality of Nature's early *tympanic* defence (swelling of the mucosa) against the septic antral discharge passing through the tympanum. Being thus able to gauge the severity of the attack by the amount of defence which Nature considers necessary, I am no longer groping in the dark in the diagnosis of tympanic conditions, but am guided as to treatment by definite clear cut indications having a pathological origin which I am able to define and demonstrate. The reliability of these indications is shown by the cure of the disease, healing of the perforation, and restoration of hearing after my mastoid operations. Further, the physician does not require the assistance of a skiagram in order to make a diagnosis of pneumonia, nor should the aural surgeon in the diagnosis of acute mastoiditis or even chronic disease of the antral walls.

Another matter bearing upon diagnosis should here be mentioned. It is as follows—*a confident diagnosis can only be made in early cases*, because in these the impairment of hearing is almost invariably due to *interference with the mobility of structures which are intact;* whereas in a chronic case *there may have been time for the destruction of some essential part.*

* During the discussion of the foregoing paper at that Congress I was asked to describe the indications for the conservative mastoid operation. In my reply I pointed out that it was impossible to accede to this request in the few minutes at my disposal, as it would entail a long preliminary pathological dissertation. This, however, is a most important matter.

A paper by Dr. F. A. Leslie, Ph.B., M.D., published in the *New York Medical Journal*, August 10, 1912, under the heading "Heath's Conservative Mastoid Operation and its Pathological Foundation," gives the most complete of the four or five descriptions of my method of operation which have been published. He there says:—

"If the abdominal appendix is diseased, it is the general opinion that an early operation should be performed in order that the danger zone should be removed. Now hearing is almost as important as life, yet it is the custom to tinker with the ear by the use of drops till life is threatened, before operation is suggested, and prior to Heath's doing it, and insisting on its being done, saving the hearing by mastoid operation does not seem to have been seriously thought of. The 'conservative' mastoid operation should regularly be performed to arrest

How can the practitioner tell when a suppurating ear is in such a condition as to call for operation in order to prevent deafness? Hitherto he has not been informed by the books. Instruction on this subject, however, is given in my work on aural suppuration now in the Press as far as it can be on paper. In my reply to the discussion I also pointed out that I did not quote this or that surgeon as authority for the teaching I gave, but that I accepted the responsibility myself.

I was recently asked to visit a hospital and perform two conservative mastoid operations in order to prevent deafness. Before deciding to do so I arranged to visit the hospital and examine the patients in the presence of the resident surgeons. Each factor in the diagnosis of the condition of the essential parts of the invisible middle-ear was explained and demonstrated. When the mental pathological picture was completed I asked if it was still thought that operations were required. The answer was "no," and with it I agreed. No operation was performed, and within a few days these ears had recovered.

discharge before the important structures in the tympanum have become irreparably damaged by it."

In a letter dated March 7, 1913, he wrote me as follows :—

"I am pleased to tell you I have recently done three Heath mastoids. I operated on one two weeks ago. He left the hospital on the seventh day and has been coming to my office daily since, and I feel sure that the entire antrum and exenterated mastoid will be filled and covered with skin in one week more."

While in London, in the month of June, 1911, during Mr. Walker Wood's* absence on vacation,

* Mr. Wood having joined the R.A.M.C. as an ear and throat specialist, I have been assisted in my mastoid operations by a medical student who was formerly a patient of mine. At that time he suffered from discharge from both of his ears. The perforations had existed for eight years and were caused by scarlet fever. I operated by my conservative method upon each of his ears, enucleated both tonsils, and removed adenoids, the combined operation taking an hour and a half. Recovery was rapid, and he left the home within a fortnight of the operation. Had his hearing not been restored by operation he would not have been fitted to enter the medical profession. He intends to become an aural surgeon.

It was formerly my rule, in cases of double aural suppuration, to operate upon the worse ear first and to allow an interval of a few months before operating upon the better one. Finding, however, that there was no shock after these operations, that practically every patient who remained in the home for a fortnight gained in weight, regretted that both ears had not been done at once, and asked to have the second one done within a week or two of the first, I have recently operated upon both ears under one anæsthesia (unless there has been some contra-indication) and have hitherto had no reason to regret the change.

Dr. Leslie assisted me in 20 of these operations, and thus had abundant opportunity of mastering the technique. As these were not hospital patients, he also assisted in the subsequent dressings, thus gaining experience of the whole procedure.

Last year Dr. Jas. Harper, Aural Surgeon to the Royal Hospital for Sick Children Dispensary, and Lecturer on Diseases of the Ear, Western Medical School, and Aural Surgeon to Out-patients, Royal Infirmary, Glasgow, wrote as follows :—

"In my practice I use nothing but the Heath operation with unqualified success. During the last nine months I have performed the Heath operation on ten cases, in three of which there were acute symptoms. The amount of shock to the patients was very slight; indeed, in some of them was practically non-existent. The rapidity of healing and the very small amount of discomfort in the dressing of the cases was a surprise to all who saw them.

"In all these cases the hearing power was considerably improved, a matter of great importance to anyone whose livelihood depends upon his hearing.

"During the past year I have had four cases of mastoid disease with complications of the lateral sinus. In one of them the sinus was thrombosed, in the other three there was a peri-sinus abscess.

"In these cases I performed the Heath operation first and then dealt with the sinus. I employed the usual Heath after-treatment, and the cases made uninterrupted recoveries. The advantages of this method of after-treatment are, that one has always complete control of the field of operation (a point

one cannot be sure of if packing be used), and that there is very slight discomfort to the patient in the subsequent dressing of the wound."

Dr. Harper's letter emphasizes a point which I have often insisted upon, viz., that it is quite unnecessary to destroy the hearing by performing a radical mastoid operation merely because delay of intervention has given time for the disease to extend to the lateral sinus or to produce a brain abscess. For if the patient survives, he will surely need his hearing, and its destruction during operation does not necessarily improve the prospect of saving life.

Mr. F. P. Sturm, M.Ch., surgeon to the Leigh Infirmary, has also written to me on this subject. His letter runs thus :—

"Six weeks ago I had an excellent opportunity of demonstrating the preservation of hearing by Heath's operation to several of my colleagues at the Leigh Infirmary. The patient was a 12 year old girl, whose left ear had discharged since the age of 3; that is for the greater part of her existence. She was quite deaf in that ear to all air-conducted sounds. A 6-feet watch could not be heard on contact. Bone conduction (tuning fork) was + 20 seconds on that side. She had been sent into the Infirmary, not to save her hearing, or on account of the otorrhœa which had been allowed to persist for so many years, but because of a sudden attack of very severe pain in the ear. There was free discharge through a large central perforation (the handle of the malleus

was almost completely destroyed), so the pain was obviously due to an obstruction in the *attic* preventing the escape of pus from a diseased antrum. The discharge was loaded with acid-fast squames. I operated that afternoon by Heath's method in the presence of Drs. Halton, Jones, Sackville, Martin, and Turner. In this chronic case, which had recently become acute, I was able to demonstrate the presence of the attic dam which Heath has described and correctly stated to be the cause of the obstruction to drainage which leads to acute mastoiditis. I was also able to show up the anatomical details of the middle-ear as clearly as in a text-book diagram, and, needless to say, much more convincingly.

"A fortnight after the operation I showed the same patient to the same doctors. She could hear ordinary conversation at six feet quite well; the watch, which previously was inaudible on contact, could be heard quite plainly at four inches. There was still some slight discharge, but the large perforation was now only of the size of a pin's point, the clearly exposed antrum was in process of rapid obliteration and all pain had ceased. Three days ago I examined her again. There was no discharge and no perforation. There was no recognizable ant um. There was practically perfect hearing. The anterior angle of the flap had sloughed a little but was healing well. This case, which I have chosen because it was used for purposes of demonstration to an audience of medical men well able to criticize the results of the method, is but one of many. In the minds of those who have adopted

this operation in their practice, or have seen it performed by others and have watched its results, there is no doubt that it has come to stay and to be our chief means of preventing deafness from aural suppuration.

"A short time ago I was assisting one of my Hospital colleagues who was doing a Schwartze operation. When he had reached and cleared out the antrum he handed the mallet and gouge to me and said, 'Turn this into a Heath; I am not satisfied with it.'" *

The case described above, in which the operation

* This remark denotes dissatisfaction with Schwartze's operation on the part of one who had often performed it. Yet it will cause no surprise to any experienced surgeon, because this method of opening the antrum combined with the subsequent plugging, are procedures out of harmony with present surgical teaching. Plugging in any cavity is undesirable, but in a septic mucous one, in cancellous bone, in the neighbourhood of vital and vulnerable structures, it is a surgical abomination.

The following case is an illustration of dissatisfaction with the radical operation.

A medical student at one of the largest Universities in Great Britain was referred to me by an aural surgeon and teacher of otology at the chief hospital which is attached to that University. This surgeon had previously performed a radical mastoid operation upon one of the ears of the student, both of which were discharging. The results of the operation were facial paralysis, disfigurement behind the ear, and deafness (such as remains after all radical operations). He then advised the patient to come to me for operation upon the other ear by my conservative method, as it was necessary to endeavour to save the hearing on one side. The result of my operation was rapid and complete cure, the discharge ceased, the perforation healed, and the hearing returned. He subsequently graduated. After the war broke out he elected to serve his country and has since been to the front as a surgeon. This he would have been unable to do if his hearing had not been restored by operation.

was performed by Mr. Sturm, proves, that acute mastoiditis due to obstruction of antral drainage by an attic dam may occur in spite of extensive destruction of the drum-head. This shows, when once the latter is perforated, that obstruction of drainage, if present, is higher up, *i.e.*, in the attic, and consequently that mutilation of the drum-head in the hope of improving the drainage is not only futile, but may, moreover, damage the hearing.

In a subsequent letter Mr. Sturm wrote, "If the operation is carried out according to Heath's instructions it is practically impossible to injure the facial nerve."

The two cases just mentioned are examples of dissatisfaction on the part of practitioners with the results of the operative measures which they practise and teach, because they have been taught to do so. With the results of the radical operation no one would be satisfied. Even the patients complain of the disablement which follows this procedure. Here are two examples, both women, one poor, the other rich, which came recently under my notice. They were brought to me in the hope of some mitigation of their miserable condition. Each had undergone the radical operation on both sides. Each was completely deaf in both ears, no vibrating tuning fork being heard when in contact with the head; consequently writing was the only means of communicating with them. Each was much disfigured on both sides. Each suffered from facial paralysis on one side. One patient was not cured of the suppuration on either side, and the meatus was stenosed on both, so that nothing could be seen of the diseased conditions within. The other patient, though cured of the discharge, suffered so badly from vertigo that she could not walk without help, an attendant being required to support her. One of these patients had been treated at a London Hospital by a teacher of otology and a writer upon this subject, the other had been treated by a provincial surgeon.

These examples of the results of the prevailing teaching and of the performance of the radical operation cannot be

In his lectures on "The Causes and Prevention of Deafness," Dr. Kerr Love writes thus :—

"The prevention of acquired deafness has to be considered under two heads :—

"(1) The better management of ear disease when it occur ;

"(2) The prevention of the diseases which cause deafness.

"Municipalities do a great deal in the way of isolation of cases of scarlet fever and measles, but they do little in the way of special treatment of the ear complications of these diseases. Cases of scarlet fever and measles are often dismissed before the ear discharge has ceased. I have seen a case of ear discharge dismissed from a fever hospital

regarded as other than disastrous, the state of the patients being worse than before the operations were undertaken.

When the prevailing system in the hands of experienced surgeons and teachers results in such disaster, is it surprising that people resort to unqualified practitioners? It is the system, however, which is at fault, and no surgical skill will make it satisfactory. Therefore the system, *i.e.*, the prevailing teaching concerning the time and method of operation, must be changed.

These cases exemplify the shortcomings of the two rough and ready mastoid operations which were in universal use when I commenced the study of otology. Such results will cause no surprise when it is pointed out that each of them is disfiguring, painful, and far more extensive than the disease usually warrants, and that neither of them was designed with the object of saving the hearing. Having observed the defects in the design of the old operations I devised a new one without them. When my operation is performed according to the rules I have laid down (and given in my forthcoming work), it is, as pointed out herein by Mr. Sturm, "practically impossible to injure the facial nerve." The disfigurement which results from the old-fashioned mastoid operations is so great that I am not infrequently asked to operate in order to get rid of it.

in the thirteenth week, and I have seen the brother of the child die of scarlet fever before the infected child was a week home from the hospital. I do not mean to say that this is a common occurrence, but there is something else that is of common occurrence. That is the persistence of the discharge and the destruction of hearing, or even the death of the child, at a later period of life. Even if the discharge has ceased, and it is sometimes thought to have ceased when it still persists, it often recurs shortly after the child passes back to the slum home. The child is often left untreated or is brought to the outdoor department of a general or special hospital where, because of irregular attendance, recovery seldom takes place.

"Now the ear disease following scarlet fever is not only infective and produces further cases, it is not only apt to return, to persist, and to destroy hearing, but in the long run it kills. The run is often a very long one. It may persist for five, ten, fifteen, twenty, or even thirty years, and then kill the patient by a brain affection. Every hospital surgeon knows this, and every aural surgeon has to operate oftener for the complications of the ear suppuration of scarlet fever and measles than for any other disease. Surely it would be wiser to have these ear complications treated by an otologist whilst the child is in the hospital for infectious diseases, than to have the otologist come in at a later stage when hearing is irreparably damaged, or life is in danger."

I not only endorse these remarks by Dr. Love, but at the risk of repetition would again allude to the

enormous loss of hearing which occurs through lack of adequate treatment in the early stages of aural suppuration, no matter how it may have been started, and to emphasize the fact that it is only in the early stages that the surgeon is really master of this disease.

Dr. Mygind of Copenhagen writes as follows on page 250 of his work on "Deaf-Mutism, and How to Prevent It."

"Every otologist has seen striking examples of the want of attention paid to ear diseases in children, and many children are admitted into deaf and dumb institutions with ear diseases which have never been submitted to medical examination, not to mention treatment. This is especially the case with suppuration of the middle-ear, which, either resulting from acute infectious disease or from any other cause, is frequently considered rather as a natural remedy than as a disease which calls for treatment. It is to be hoped that the recognition which is by degrees, though slowly, being yielded to Otology by the medical profession will make itself felt in the prevention of deaf-mutism by opening the eyes of practitioners to the importance of ear diseases and their treatment, and also that the general public may be led to form other opinions upon the subject than those now prevalent."

I have long contended, and Dr. Mygind's words appear to endorse the view, that deaf-mutism through aural suppuration is usually preventable. It surely is far better to prevent deafness than to

provide homes for those, who, becoming deaf when very young, consequently become dumb. Our practical mastery of obstinate aural suppuration by the opportune performance of the conservative mastoid operation is a matter of importance to so many, that *I bring it directly to the notice of the whole of the medical profession*, in the hope that it will be passed on to the people, for I agree with Dr. Mygind in considering that the co-operation of the people is essential in order that suppurating ears shall be promptly treated and not neglected, as at present, in deference to the old belief that a discharge from the ear is beneficial and "better out than in."

The benefits which have accrued through the action of local authorities in setting up hospitals for the treatment of certain eye diseases and ringworm, *has brought home to the people the need of such treatment.* Similar desirable results would doubtless follow the establishment of hospitals for the treatment of certain diseases of the ear, which are now often ignored—above all, aural suppuration* (mastoid disease). Further, it is essential for the well-being of the community that experts should be appointed to treat the aural complications which occur among the patients, suffering from infectious diseases, who are treated in fever and other hospitals under public control. In the voluntary general hospitals an aural surgeon is available, and the public hospitals should be similarly staffed. Through lack of expert

* The profession does not. How then can we expect the public to realize the need of prompt treatment for discharging ears? *Until a hospital is established for this purpose there will be no awakening.*

treatment in these large public hospitals during the early stages of inflammation of the middle-ear—a common condition in scarlet fever—a proportion of the patients become permanently deafened before they leave and seek advice at special ear hospitals. The existing ear hospitals and the ear departments of the general hospitals are outrageously overworked and inadequately supplied with beds. Five times as many beds and five times as many aural surgeons as are now available for the treatment of ear diseases, are required, and thousands of mastoid operations must be performed in London every year if the large amount of deafness which now results from inadequate treatment of aural suppuration is to be prevented.* In the schedule it will be seen that the conservative mastoid operation, which, when performed early enough saves the hearing in a considerable proportion of cases of aural discharge, is as safe as the removal of a tooth; whereas delay is dangerous. "Wait and see" in aural suppuration often results in "too late." The surgeon who, in this disease, waits to see, will often see conditions which neither he nor anyone can cure. An aural surgeon at a general hospital recently informed me that "it was absolutely impossible for him

* The proportion of the people of this country who suffer from aural discharge is far greater than is generally realized, and is doubtless partly due to the changeable climate. Yet the difficulty is not insuperable, for one aural surgeon, with the help of one house surgeon and the half-time assistance of an anæsthetist, should be able to perform from 6 to 700 mastoid operations a year, and would require about 30 beds for the purpose. He would then have ample time to attend to the after-treatment. This statement implies service in a hospital under public control.

to admit any cases of aural suppuration but those whose lives were in imminent danger from intracranial complications; that there were more than enough of these forlorn hopes to fill all his beds."

This is too big and too serious a matter to be left any longer to the charitable. The responsibility rests on all.

Being the first to advocate conservative mastoid operations in order to prevent deafness through aural suppuration, to design an operation, and to operate for the purpose, to prove its efficacy,* safety, and freedom from pain or disfigurement, as well as from risk of injury to the facial nerve (see herein); and being moreover the first to devise and teach a method of diagnosis of tympanic conditions whereby the need of operation in order to prevent deafness can be recognized, it behoves me to pass on my experience to others. With this object I am setting up a hospital and clinic where teaching will be given, particularly with regard to the pathology of the curable stages of aural suppuration, the diagnosis of the conditions calling for surgical intervention in order to save hearing,† and the conservative treat-

* See *The Lancet*, of August 11, 1906, for a report of the first ten cases of operation by my conservative method, and the issue of December 15, 1906, for a report of a meeting of the British Laryngological and Otological Association, when these ten cases were exhibited.

† The diagnosis of these conditions has been in abeyance since I relinquished my work and teaching at the Throat Hospital, Golden Square, because no one else has undertaken instruction of this kind, nor has it ever been described in the books. Therefore, unless diagnosis is taught clinically, it will be neglected and without it there is no reliable guide as to treatment.

ment of the disease by operation and otherwise. The clinical material now at my disposal will there be made useful to others, and the "leading cases" which are described in my forthcoming work will be exhibited as aids in expounding the otological principles which I have laid down. It is my hope that this hospital will not only assist in arresting disease and preventing deafness, but also that it will afford scope for more complete, as well as more rapid, instruction than I can now give.

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